CLAIMS

What is claimed is:

1. A method for acquiring images using an automated optical microscope system, comprising the steps of:

configuring an optical microscope system which comprises a camera, a microscope, an information handling system and a device for altering an image acquisition parameter;

acquiring images at a rate substantially close to the maximum image acquisition rate of said camera; and

altering, during image acquisition, at least one image acquisition parameter which applies to the next image;

wherein the configuring step comprises initializing a range of values over which said image acquisition parameters will vary during the acquiring of images.

2. The method of claim 1, where the at least one image acquisition parameter being altered is focus plane, light intensity, excitation wavelength or emission wavelength.

3. The method of claim 2, wherein the at least one image acquisition parameter being altered during image acquisition is excitation wavelength or emission wavelength, whereby a stack of fluorescence images is acquired.

4. The method of claim 1, wherein the configuring step further comprises initializing a duration of time during which images will be acquired.

5 . The method of claim 1, wherein, during acquisition of at least one image, more than one image acquisition parameter which applies to the next image is altered.

6. The method of claim 5, wherein, during acquisition of at least one image, excitation wavelength and emission wavelength which apply to the next image are altered.

7. The method of claim 1, wherein the information handling system comprises a memory,

further comprising the step of storing a stack of images in the memory.

8. An automated optical microscope system programmed to contain a computer program product that executes the steps of claim 7, comprising:

a microscope,

a camera,

an information handling system comprising a memory, and

a device for altering one or more of the image acquisition parameters of focus plane, excitation wavelength or emission wavelength.

9. An automated optical microscope system programmed to contain a computer program product that executes the steps of claim 1, comprising:

a microscope,

a camera,

an information handling system, and

a device for altering one or more of of the image acquisition parameters of focus plane, excitation wavelength or emission wavelength.

10. The automated optical microscope system of claim 9,

wherein the microscope comprises an objective lens and an objective lens positioner, and

wherein the computer program product contains programming for directing the objective lens positioner to reposition the objective lens between images.

11. The automated optical microscope system of claim 9,

wherein the microscope comprises an examination site and an examination site positioner, and

wherein the computer program product contains programming for directing the examination site positioner to reposition the examination site between images.

12. The automated optical microscope system of claim 9,

wherein the microscope comprises a wavelength selector for selecting the excitation wavelength or emission wavelength or both, and

wherein the computer program product contains programming for directing the wavelength selector to re-select excitation wavelength or emission wavelength or both between images.

13. The automated optical microscope system of claim 12, wherein the wavelength selector is a monochromator.

14. The automated optical microscope system of claim 12, wherein the wavelength selector is a filter wheel.

15. The automated optical microscope system of claim 9, wherein the microscope comprises a shutter and

wherein the computer program product contains programming for controlling the shutter.

16. An automated fluorescence imaging system comprising:

a light source;

a light source wavelength selector;

a specimen examination site;

an optical system;

an optical system positioner for changing the position of at least a portion of the optical system relative to the specimen examination site;

a fluorescence emission wavelength selector;

a camera;

means for acquiring images from the camera at a rate substantially close to the maximum image acquisition rate of the camera;

and

a processor for automatically controlling one or more of the light source wavelength selector, the optical system positioner or the fluorescence emission wavelength selector while a stack of images is being acquired.

17. The automated fluorescence imaging system of claim 16, wherein the optical system positioner comprises means for adjusting the focus plane of the optical system.

18 . An automated imaging system comprising:

a specimen examination site;

an optical system;

an optical system positioner for changing the position of at least a portion of the optical system relative to the examination site;

a wavelength selector; and

means for automatically controlling either or both of the wavelength selector or the optical system positioner while acquiring a stack of images, the wavelength selection or optical position being changed between images and the images being acquired at a rate substantially close to the maximum image acquisition rate of the camera.

19. The automated imaging system of claim 18, further comprising:

a fluorescence emission wavelength selector, and

means for automatically controlling the fluorescence emission wavelength selector while acquiring a stack of fluorescence images.

20. The automated imaging system of claim 19, wherein the fluorescence emission wavelength selector is a filter wheel.

21. The automated imaging system of claim 18, wherein the optical system positioner comprises means for adjusting the focus plane of the optical system.

22. The automated imaging system of claim 18, wherein the wavelength selector is a filter wheel.

23. The automated imaging system of claim 18, wherein the wavelength selector is a monochromator.

24. The automated imaging system of claim 18, further comprising a mechanical shutter in the optical system.

25. An automated method for acquiring images comprising the steps of:

providing an optical system which comprises optical elements, a camera and a means for changing an image acquisition parameter;

acquiring a stack of images at a rate substantially close to the maximum image acquisition rate of the camera; and

changing an image parameter between images, the change being triggered by the beginning of the read out of an image.

26. The automated method for acquiring images of claim 25, wherein an image acquisition parameter that is changed is focus plane and

the optical system further comprises means for changing focus plane.

27. The automated method for acquiring images of claim 25, wherein an image acquisition parameter that is changed is excitation wavelength and

the optical system further comprises at least one of a monochromator or a filter wheel for changing excitation wavelength.

28. The automated method for acquiring images of claim 25, wherein an image acquisition parameter that is changed is emission wavelength and

the optical system further comprises a filter wheel for changing emission wavelength.

29. The automated method for acquiring images of claim 25, wherein the images in the stack are fluorescence images.

30. The automated method for acquiring images of claim 29, and

between at least one pair of images, the image acquisition parameters of excitation wavelength and emission wavelength are changed.